

WHAT IS CLAIMED IS:

Sub Q1

1. A coding device comprising:

coding means for coding an external input signal in a macroblock unit;

first storing means for storing a code output from said coding means;

5 second storing means for storing an output from said first storing means; and

code volume control means for controlling transfer of said code stored in said first storing means to said second storing means based on a code volume of said code obtained by said coding means such that a length of a video packet constituted by said code is a predetermined length or less.

10 2. The coding device according to claim 1, wherein

said code volume control means controls storage of a stuffing in said second storing means based on a minimum code volume obtained for each unit image constituted by a video packet which is required for coding said unit image.

15 3. The coding device according to claim 2, wherein

said code volume control means determines a minimum code volume T_{min} to satisfy a following equation:

$$T_{min} \geq 2 \cdot R_p - B$$

$$R_p = R / F$$

20 wherein a bit count read from said second storing means in a unit image is represented by R_p , an occupancy in said second storing means is represented by B , a bit rate read from said second storing means is represented by R , and a rate of a unit image to be coded is represented by F .

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4. The coding device according to claim 3, wherein
said bit rate R read from said second storing means is variable.

5. The coding device according to claim 2, wherein
5 said code volume control means determines a minimum code volume T_{min} to
satisfy a following equation:

$$T_{\min} \geq \text{vbv_bits} + 2 \cdot R_p - \text{vbv_bs}$$

$$R_p = R / F$$

wherein a bit count read from said second storing means in a unit image is represented by
10 R_p , an occupancy of a VBV buffer in a last unit image is represented by vbv_bits , a size
of said VBV buffer is represented by vbv_bs , a bit rate read from said second storing
means is represented by R, and a rate of a unit image to be coded is represented by F.

6. The coding device according to claim 5, wherein
15 said bit rate R read from said second storing means is variable.

7. The coding device according to claim 2, wherein
said code volume control means determines a minimum code volume T_{min}
based on a following equation or a value having a result equivalent to a result of said
20 equation:

$$T_{\min} = \max(2 \cdot R_p - B, \text{vbv_bits} + 2 \cdot R_p - \text{vbv_bs})$$

$$R_p = R / F$$

wherein a bit count read from said second storing means in a unit image is represented by
 R_p , an occupancy in said second storing means is represented by B, an occupancy of a
25 VBV buffer in a last unit image is represented by vbv_bits , a size of said VBV buffer is

represented by vbv_bs, a bit rate read from said second storing means is represented by R, and a rate of a unit image to be coded is represented by F.

8. The coding device according to claim 7, wherein said bit rate R read from said second storing means is variable.

9. The coding device according to claim 2, wherein said code volume control means inserts a stuffing into a video packet until a first relationship is not satisfied, when a present code volume of a unit image including a last coded macroblock constituting said unit image is smaller than said minimum code volume Tmin of said unit image and a number M of macroblocks to be coded subsequently to said last coded macroblock, a predetermined length VPlen of said video packet, said minimum code volume Tmin and said present code volume Sc have said first relationship:

$$M \cdot VPlen < Tmin - Sc,$$

said code volume control means constitutes a video packet next to said video packet by a macroblock next to said last coded macroblock without inserting a stuffing into said video packet, when said first relationship is not established and said number M of macroblocks, said length VPlen of a video packet, said minimum code volume Tmin and said present code volume Sc have a second relationship:

$$(M - 1) \cdot VPlen < Tmin - Sc.$$

10. A coding method comprising the steps of:

(a) coding an external input signal in a macroblock unit;

(b) storing a code obtained at said step (a);

(c) controlling an output of said code stored at said step (b) such that a length of a video packet constituted by said code obtained at said step (a) is a predetermined length or less based on a code volume of said code; and

(d) storing said output controlled by said step (c).

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11. The coding method according to claim 10, wherein
said step (c) serves to control storage of a stuffing at said step (d) based on a minimum code volume obtained for each unit image constituted by a video packet which is required for coding said unit image.

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12. The coding method according to claim 11, wherein
said step (c) serves to determine a minimum code volume T_{min} to satisfy a following equation:

$$T_{min} \geq 2 \cdot R_p - B$$

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$$R_p = R / F$$

wherein a bit count read by said step (d) in a unit image is represented by R_p , an occupancy in said step (d) is represented by B , a bit rate read by said step (d) is represented by R , and a rate of a unit image to be coded is represented by F .

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13. The coding method according to claim 12, wherein
said bit rate R at which a code stored at said step (d) is read is variable.

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14. The coding method according to claim 11, wherein
said step (c) serves to determine a minimum code volume T_{min} to satisfy a following equation:

$$T_{\min} \geq \text{v bv_bits} + 2 \cdot R_p - \text{v bv_bs}$$

$$R_p = R / F$$

wherein a bit count read by said step (d) in a unit image is represented by R_p , an occupancy of a VBV buffer in a last unit image is represented by v bv_bits , a size of said VBV buffer is represented by v bv_bs , a bit rate read by said step (d) is represented by R , and a rate of a unit image to be coded is represented by F .

15. The coding method according to claim 14, wherein said bit rate R at which a code stored at said step (d) is read is variable.

16. The coding method according to claim 11, wherein said step (c) determines a minimum code volume T_{\min} based on a following equation or a value having a result equivalent to a result of said equation:

$$T_{\min} = \max(2 \cdot R_p - B, \text{v bv_bits} + 2 \cdot R_p - \text{v bv_bs})$$

$$R_p = R / F$$

wherein a bit count read by said step (d) in a unit image is represented by R_p , an occupancy in said step (d) is represented by B , an occupancy of a VBV buffer in a last unit image is represented by v bv_bits , a size of said VBV buffer is represented by v bv_bs , a bit rate read by said step (d) is represented by R , and a rate of a unit image to be coded is represented by F .

17. The coding method according to claim 16, wherein said bit rate R at which a code stored at said step (d) is read is variable.

18. The coding method according to claim 11, wherein

said step (c) serves to insert a stuffing into a video packet until a first relationship is not satisfied, when a present code volume of a unit image including a last coded macroblock constituting said unit image is smaller than said minimum code volume T_{min} of said unit image and a number M of macroblocks to be coded subsequently to said last coded macroblock, a predetermined length $VPlen$ of said video packet, said minimum code volume T_{min} and a present code volume Sc have a first relationship: $M \cdot VPlen < T_{min} - Sc$,

said code volume controlling step serves to constitute a video packet next to said video packet by a macroblock next to said last coded macroblock without inserting a stuffing into said video packet, when said first relationship is not established and said number M of macroblocks, said length $VPlen$ of a video packet, said minimum code volume T_{min} and said present code volume Sc have a second relationship: $(M - 1) \cdot VPlen < T_{min} - Sc$.